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**Formalities Officer**

Name:

Tel.:

Date

13.09.07

Reference  
20051119

Application No./Patent No.  
03740495.1 - 2424 / 1653094

Applicant/Proprietor  
ZF FRIEDRICHSHAFEN AG

#### Decision to grant a European patent pursuant to article 97(2) EPC

Following examination of European patent application No. 03740495.1 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 51(4) EPC dated is hereby granted in respect of the designated Contracting States. Any modifications which were subsequently requested have been approved by the Examining Division.

Patent No. : 1653094  
Date of filing : 07.07.03  
Priority claimed : /

Designated Contracting States  
and Proprietor(s) : AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL  
PT RO SE SI SK TR  
ZF FRIEDRICHSHAFEN AG  
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This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(4) and (5) EPC).

The mention of the grant will be published in European Patent Bulletin 07/41 of 10.10.07.

Examining Division

Fittante G

Cuny J

Fischbach G



ANMERKUNG ZUR ENTSCHEIDUNG ÜBER DIE ERTEILUNG  
EINES EUROPÄISCHEN PATENTS (EPA Form 2006)

1. **EPA Informationsbroschüre "Nationales Recht zum EPÜ"**

Diese Broschüre enthält nützliche Informationen zu den formalen Erfordernissen und den Handlungen, die vor den Patentbehörden der Vertragsstaaten vorzunehmen sind, um Rechte in diesen Staaten zu erlangen. Da diese Handlungen einem ständigen Wandel unterworfen sind, sollte immer nur die neueste Ausgabe der Broschüre benutzt werden. Nachträgliche Informationen werden im Amtsblatt veröffentlicht.

2. **Übersetzung der europäischen Patentschrift nach Artikel 65(1) des Europäischen Patentübereinkommens**

Sie werden erneut darauf hingewiesen, dass bestimmte Vertragsstaaten nach Artikel 65(1) EPÜ eine Übersetzung der europäischen Patentschrift verlangen; hierauf wird in der Mitteilung gemäss Regel 51(6) verwiesen. **Die Nichteinreichung dieser Übersetzung kann zur Folge haben, dass das Patent in dem betreffenden Staat/in den betreffenden Staaten als von Anfang an nicht eingetreten gilt.** Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.

3. **Zahlung von Jahresgebühren für europäische Patente**

Nach Artikel 141 EPÜ können "nationale" Jahresgebühren für das europäische Patent für die Jahre erhoben werden, die an das Jahr anschliessen, in dem der Hinweis auf die Erteilung des europäischen Patents im "Europäischen Patentblatt" bekanntgemacht wird. Weitere Einzelheiten entnehmen Sie bitte der oben genannten Broschüre.

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NOTE RELATING TO THE DECISION TO GRANT A  
EUROPEAN PATENT (EPO Form 2006)

1. **EPO Information Brochure "National law relating to the EPC".**

This brochure provides useful information regarding formal requirements and the steps to be taken before the patent authorities of the Contracting States in order to acquire rights in those states. Since the necessary steps are subject to change the latest edition of the brochure should always be used. Subsequent information is published in the Official Journal.

2. **Translation of the European patent specification under Article 65(1) of the European Patent Convention**

Your attention is again drawn to the requirements regarding translation of the European patent specification laid down by a number of Contracting States under Article 65(1) EPC, to which reference is made in the communication under Rule 51(6). **Failure to supply such translation(s) may result in the patent being deemed to be void "ab initio" in the State(s) in question.** For further details you are recommended to consult the above-mentioned brochure.

3. **Payment of renewal fees for European patents**

Under Article 141 EPC "national" renewal fees in respect of a European patent may be imposed for the years which follow that in which the mention of the grant of the European patent is published in the "European Patent Bulletin". For further details you are recommended to consult the above-mentioned brochure.

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REMARQUE RELATIVE A LA DECISION DE DELIVRANCE  
D'UN BREVET EUROPEEN (OEB Form 2006)

1. **Brochure d'information de l'OEB "Droit national relatif à la CBE"**

Cette brochure fournit d'utiles renseignements sur les conditions de forme requises et sur les actes à accomplir auprès des offices de brevet des Etats contractants aux fins d'obtenir des droits dans les Etats contractants. Etant donné que les actes indispensables sont susceptibles de modifications, il serait bon de toujours consulter la dernière édition de la brochure. Toute information ultérieure est publiée au Journal Officiel.

2. **Traduction du fascicule du brevet européen en vertu de l'article 65(1) de la Convention sur le brevet européen**

Votre attention est de nouveau attirée sur l'obligation faite par certains Etats contractants, en vertu de l'article 65(1) CBE, de fournir une traduction du fascicule du brevet européen, à laquelle il est fait référence dans la notification établie conformément à la règle 51(6). **Si la(les) traduction(s) n'est(ne sont) pas fournie(s), le brevet européen peut, dès l'origine, être réputé sans effet dans cet(ces) Etat(s).** Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.

3. **Paiement des taxes annuelles pour le brevet européen**

Conformément à l'article 141 CBE, les taxes annuelles "nationales" dues au titre du brevet européen peuvent être perçues pour les années suivant celle au cours de laquelle la mention de la délivrance du brevet européen est publiée au "Bulletin européen des brevets". Pour plus de détails, nous vous renvoyons à la brochure susmentionnée.

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INTERNATIONAL PATENT AND  
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ABOGADOS - LAWYERS

EPO - Munich  
59

29 Aug. 2007

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TERESA DELGADO  
VICKY RUIZ

BY FAX (5 pages)

Confirmation by DHL

Your ref.

Our ref.  
PX 20051119

Madrid,  
24 August 2007

European Patent Application No. 03740495.1  
Applicant: ZF FRIEDRICHSHAFEN AG

Dear Sirs,

Further to your communication under Rule 51(4) EPC dated 15 June 2007 relating to the intention of grant of the above mentioned application, we hereby confirm our approval to the description and claims as proposed by the Examining Division, the applicant's particulars as well as the title of the invention in the three official languages. In order to fulfil the requirements for grant, we are enclosing the translation of the claims into French and German.

To that purpose we are enclosing herewith the EPO Form 1010 requesting to debit from Deposit Account No. 28120019 the amount of EUR 750,00 in payment of the fee for grant including fee for printing.

With reference to the "Decision of the President of the European Patent Office dated 22 December 2004 concerning the content and form of the certificate for a European patent, and the procedure for issuing it", we herewith request that the EPO send us (for each proprietor, and free of charge) the certificate for the European patent together with a copy of the patent specification.

Yours faithfully,

HERRERO & ASOCIADOS  
Carpintero López, Francisco

Zur Kasse €750,- (A)

\*AGENTES DE LA PROPIEDAD INDUSTRIAL - \*AGENTES EUROPEOS DE PATENTES - \*AGENTES EUROPEOS DE MARCAS  
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HERRERO & ASOCIADOS, S.L. Insc. R. M. Madrid, Tomo 6.660, General 594, Secc. 4.ª, Folio 39, Hoja 10.698 CIF/VAT ES B 28865236  
HERRERO & ASOCIADOS Portugal, Patentes e Marcas, LDA. Registro Comercial de Lisboa Nº 15647. Capital 12000 euros. VAT Nº PT 507 449 142



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Office européen  
des brevets

Direction Générale 2

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Application No. 03 740 495.1 - 2424	Ref. 20051119	Date 15.06.2007
Applicant ZF FRIEDRICHSHAFEN AG		

#### Communication under Rule 51(4) EPC

You are informed that the Examining Division intends to grant a European patent on the basis of the above application with the text and drawings as indicated below:

In the text for the Contracting States:

AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

#### Description, Pages

1, 2, 4-6 filed with entry into the regional phase before the EPO  
3 received on 18.05.2007 with letter of 16.05.2007

#### Claims, Numbers

1, 2 received on 18.05.2007 with letter of 16.05.2007

#### Drawings, Sheets

1/5-5/5 filed with entry into the regional phase before the EPO

#### With the following amendments to the above-mentioned documents by the examining division

Description, Pages 3\*  
Claims, Numbers 1\*

#### Comments

N.B.: The international application on which the present European patent application is based was published in the Spanish language on 20 January 2005.

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Concerning the patentability requirements stipulated in Article 52 (1) EPC, it is noted that none of the prior art documents which have become known during examination proceedings fairly suggests the geometrical configuration of a ball joint with thermal protection according to the characterising part of admissibly restricted independent claim 1 in combination, thereby satisfying the EPC requirements in particular as stipulated in Articles 123 (2) and 56 EPC (compare the preliminary comments on non-obviousness as given under point 1.3 of the first official communication dated 19 February 2007).

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\* Article 84 (clarity) and Rules 27 (1)(b), 29 (1) and 35 (13) EPC (concerning terminology in claim 1, compare also page 6 of the description, line 9).

A copy of relevant documents is enclosed

The title of the invention in the three official languages of the European Patent Office, the international patent classification, the designated Contracting States, the registered name of the applicant and the bibliographic data are shown on the attached EPO Form 2056.

You are requested within a **non-extendable** period of four months of notification of this communication

1.	to file 1 set of translations of the claim(s) in the two other EPO official languages;		EUR
2a.	to pay the fee for grant including the fee for printing up to and including 35 pages; Reference 007		750.00
2b.	to pay the printing fee for the 36th and each additional page; number of pages: 0	Reference 008	0.00
3.	to pay the additional claim fee(s) (Rule 51(7) EPC); number of claims fees payable:	Reference 016	0.00
		Total amount	750.00

Concerning the possibility of a request for accelerated grant pursuant to Article 97(6) EPC, reference is made to OJ EPO 2001, 459.

If you do not approve the text intended for grant but wish to request amendments or corrections, the procedure described in Rule 51(5) EPC is to be followed.

If this communication is based upon an auxiliary request, and you reply within the time limit set that you maintain the main or a higher ranking request which is not allowable, the application will be refused (Article 97(1) EPC, see also Legal Advice 15/05 (rev. 02), OJ 6/2005, 357).

If the enclosed claims contain amendments proposed by the Examining Division, and you reply within the time limit set that you cannot accept these amendments, refusal of the application under Article 97(1) EPC would result in the case that agreement cannot be reached on the text for grant.

In all cases except those of the previous two paragraphs, if the grant, printing or claims fees are not paid, or the translations not filed, in due time, the European patent application will be deemed to be withdrawn (Rule 51(8) EPC).

For all payments you are requested to use EPO Form 1010 or to refer to the relevant reference number.



After publication, the European patent specification can be downloaded free of charge from the EPO publication server <https://publications.european-patent-office.org> or ordered only from the Vienna sub-office upon payment of a fee (OJ EPO 2005, 126).

Upon request in writing each proprietor will receive the certificate for the European patent **together with one copy** of the patent specification only if the request is filed within the time limit of Rule 51(4) EPC. If such request has been previously filed, it has to be confirmed within the time limit of Rule 51(4) EPC. The requested copy is free of charge. If the request is filed after expiry of the Rule 51(4) EPC time limit, the certificate will be delivered without a copy of the patent specification.

#### Translation of the priority document(s)

If the translation of the priority document(s), as required by Article 88(1) EPC, or the declaration according to Rule 38(5) EPC has not yet been filed, Form 2530 will be despatched separately. The translation is to be filed within the above mentioned time limit (Rule 38(5) EPC).

#### Note on payment of renewal fees

If a renewal fee falls due between notification of the present communication and the proposed date of publication of the mention of the grant of the European patent, publication will be effected only after the renewal fee and any additional fee have been paid (Rule 51(9) EPC).

Under Article 86(4) EPC, renewal fees are payable to the European Patent Office until the year in which the mention of the grant of the European patent is published.

#### Filing of translations in the Contracting States

Pursuant to Article 65(1) EPC the following Contracting States require a translation of the specification of the European patent in their/one of their official language(s) (Rule 51(10) EPC), **insofar** this specification will not be published in their/one of their official language(s)

- within **three** months of publication of the mention of such decision:

AT	AUSTRIA	GB	UNITED KINGDOM
BE	BELGIUM	GR	GREECE
BG	BULGARIA	HU	HUNGARY
CH	SWITZERLAND / LIECHTENSTEIN	IT	ITALY
CY	CYPRUS	NL	NETHERLANDS
CZ	CZECH REPUBLIC	PT	PORTUGAL
DE	GERMANY	RO	ROMANIA
DK	DENMARK	SE	SWEDEN
EE	ESTONIA	SI	SLOVENIA
ES	SPAIN	SK	SLOVAKIA
FI	FINLAND	TR	TURKEY
FR	FRANCE		

- within **six** months of publication of the mention of such decision:

IE IRELAND

The date on which the European Patent Bulletin publishes the mention of the grant of the European patent will be indicated in the decision on the grant of the European patent (EPO Form 2006).

The translation must be filed with the national Patent Offices of the Contracting or Extension States in accordance with the provisions applying thereto in the State concerned. Further details (e.g. appointment



of a national representative or indication of an address for service within the country) are given in the EPO information brochure "National law relating to the EPC", and in the supplementary information published in the Official Journal of the EPO, or available on the EPO website.

Failure to supply such translation to the Contracting and Extension States in time and in accordance with the requirements may result in the patent being deemed to be void ab initio in the State concerned.

Note to users of the automatic debiting procedure

Unless the EPO receives prior instructions to the contrary, the fee(s) will be debited on the last day of the period of payment. For further details see the Arrangements for the automatic debiting procedure (see Supplement to OJ EPO 2, 2002).

**Examining Division:**

<b>Chairman:</b>	Fischbach, Gerhard
<b>2nd Examiner:</b>	Cuny, Jean-Marie
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Enclosure(s):      Form 2056  
                         13 Copies of the relevant documents

**Annex to EPO Form 2004, Communication under Rule 51(4) EPC**

**Bibliographical data of European patent application No. 03 740 495.1**

For the intended grant of a European patent, the bibliographical data are set out below, for information:

**Title of invention:**                    - GELENK MIT WÄRMESCHUTZ  
   - KNUCKLE WITH THERMAL PROTECTOR  
   - ROTULE A PROTECTION THERMIQUE

**Classification:**                        INV. F16C11/06 B62D7/16 B60G7/00 B60G21/055

**Date of filing:**                        07.07.2003

**Priority claimed:**

**Contracting States\***  
for which fees have  
been paid:                                AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL  
   PT RO SE SI SK TR

**Extension States\***  
for which fees have  
been paid:

**Applicant(s)\*\*:**                        ZF FRIEDRICHSHAFEN AG  
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\*) In case the time limits pursuant to Article 79(2) and Rule 85a EPC have not yet expired, **all Contracting States/Extension States** have been mentioned.

\*\*) In case two or more applicants have designated different Contracting States, this is indicated here.



~~BALL JOINT WITH THERMAL PROTECTOR~~~~D E S C R I P T I O N~~

5

## OBJECT OF THE INVENTION

10 The present invention refers to a ball joint of the type used in vehicle suspension and steering systems or stabilizers bars fitted with a dust boot to prevent the entry of dirt.

15 It is the object of the invention that the ball joint should incorporate an integrated thermal protector that will minimize the transmission of heat to the interior of the ball joint, in particular the heat generated by the brakes of the vehicle in order to prevent the rubber dust boot or cover from being damaged by the high temperatures generated in the surrounding area.

20 It is also an object of the invention that the thermal protector should be perfectly integrated in the ball joint with the additional assistance of a connecting ring, affixed previously to the dust boot on which the protector is suitably attached.

## BACKGROUND OF THE INVENTION

30 On vehicle suspension and steering systems it is common to make use of ball joints to interconnect components in such a way that they facilitate the angular variations that take place in the relative movement between these components.

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The ball joints comprise a swivel housing fitted with means for coupling to a first component of the suspension for instance, and they are provided with a housing in which there is a bush accommodating the ball head of the knuckle stem, which is in turn extended in an upper section linked to a second component, in relation to which the first component undergoes angular variations.

Suspension ball joints are located in a position very close to the brake disc, so that the heat generated by the braking action is transmitted to the sector where the ball joint is located.

The ball joint normally incorporates a rubber cover or dust boot that is not able to withstand continuous high temperature of more than 85°C or temperature peaks above 100°C.

Disc brakes, however, may easily reach 500°C and the heat given off may therefore eventually break down the rubber or dust boot impairing its function, with the result that the cover is unprotected and the failure of the ball joint may take place in a short time.

In order to prevent the dust boot from acquiring high temperatures disc brakes are fitted with heat shields consisting essentially of a large-sized plate that covers the whole of the disc brake.

Another possible solution currently implemented consists of using heat protectors for the ball joint formed of a discrete part fitted independently of the ball joint.

&lt;-&gt;

The optimization of the means used for the protection of the ball joint from heat make the invention described below feasible.

5      **DESCRIPTION OF THE INVENTION** *The invention is defined in claim 1. Further features are disclosed in the dependent claim.*

10      The ball joint with integrated thermal protector proposes a clearly satisfactory solution in comparison with other solutions adopted previously in terms of functional efficacy, installation and reduction of costs.

15      The use of this ball joint with thermal protector reduces costs considerably in relation to the use of shields on the disc brakes, not only because it is the case of a protection element of smaller size and weight, but also due to the reduction in installation operations and in the number of components.

20      Furthermore, the thermal protector has an added feature in that it acts as a means of protection against the damage that the ball joint might suffer during handling, as it replaces the plastic cap normally used for this purpose.

25      Integration of the thermal protector in the ball joint is therefore the basic object of this invention, since it is designed to cover the dust boot normally fitted to the ball joint, which is provided with a connecting ring that is fixed to the dust boot beforehand and on which the thermal protector is attached.

30      For its part the dust boot consists of a rubber cover which is normally fitted on an upper shoulder of the ball joint swivel housing and is extended upwards with sinuous forms as far as an upper neck which closes

35      *< WO-A-02/101250 discloses an arrangement comprising, substantially according to the preamble of claim 1. >*  
*inter alia, the features*

around an upper section of the knuckle stem.

The connecting ring may be injected on the neck of the dust boot, being an ideal solution for facilitating the subsequent installation of the protector, as the assembly made up of the dust boot and pre-fitted ring will be received ready formed from the elastomer manufacturer.

In another possible embodiment the ring is press-fitted and/or glued onto the neck of the dust boot.

The thermal protector consists of a body of suitable geometry partly open in one sector of its side face and on its top face it presents a series of flexible radial plates which define a circular opening interiorly.

Upon inserting the protector in the ring from its top face, the plates flex slightly at their inner edges until they pass over some tabs defined on the side face of the ring and they are engaged between the tabs and the base of the ring. In this way the protector is coupled on the ring which had been attached previously to the dust boot.

The protector thus fitted covers the dust boot, preventing it from reaching excessively high temperatures.

#### DESCRIPTION OF THE DRAWINGS

To supplement the description being given and to make it easier to appreciate the features of the invention, in accordance with a preferred specimen

practical embodiment of same, the present descriptive report is accompanied as an integral part hereof by a set of drawings wherein, for informative but never restrictive purposes, we have represented the following:

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Figure 1.- It shows a perspective view of the ball joint with thermal protector.

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Figure 2.- It shows a sectional side view of the ball joint with thermal protector.

Figure 3.- It shows a perspective view of the thermal protector.

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Figure 4.- It shows a perspective view of the connecting ring.

20

Figure 5.- It shows a perspective view of the protector, ring and dust boot.

#### **PREFERRED EMBODIMENT OF THE INVENTION**

25

In the light of the figures we may observe the ball joint with thermal protection that is of application to vehicle suspension and steering systems or stabilizer bars which are located in close proximity to a source of excessive heat generation such as a brake, and which starts from the basic incorporation of a swivel housing (1) on which one of the suspension or equivalent components is coupled and which presents in its interior a housing (2) accommodating a bush (3) which rests and turns in sliding contact on a ball head (4) of a knuckle stem (5), provided with dust boot (6) linked by way of its base to the swivel housing (1) and by its neck (7) to an upper section (8) of the knuckle stem (5).

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Starting from this basic configuration the most noteworthy feature of the ball joint is the inclusion of a thermal protector (9) integrated in the ball joint presenting a horizontal upper face that incorporates a series of flexible radial plates (10) which define a circular opening (11) interiorly that is coupled on a connecting ring (12) attached beforehand to the neck (7) of the dust boot (6) by overinjection or pressure and/or gluing, so that the thermal protector (9) covers the dust boot (6) to protect it from the high temperatures generated in the surrounding area.

The connecting ring (12) presents a base (13) and a side face projecting from which there is a series of tabs (14) on which the plates (10) of the upper face of the thermal protector (9) are pressed when the thermal protector (9) is fitted, until the plates (10) pass over said tabs (14) and are engaged between the tabs (14) and the base (13) of the connecting ring (12).

The thermal protector (9) is executed in suitable material to withstand the temperatures and mechanical stress and takes the form of a hood which extends initially in the horizontal upper face and is prolonged inferiorly by way of sloping side edges that terminate in vertical walls (16) defining a spacious cutaway (15) that leaves the dust boot (6) practically exposed in the sector opposite the sector of the ball joint facing the heat source. Said vertical walls (16) are separated from the dust boot (6) defining an air chamber between both which produces the thermal insulation of the dust boot (6).

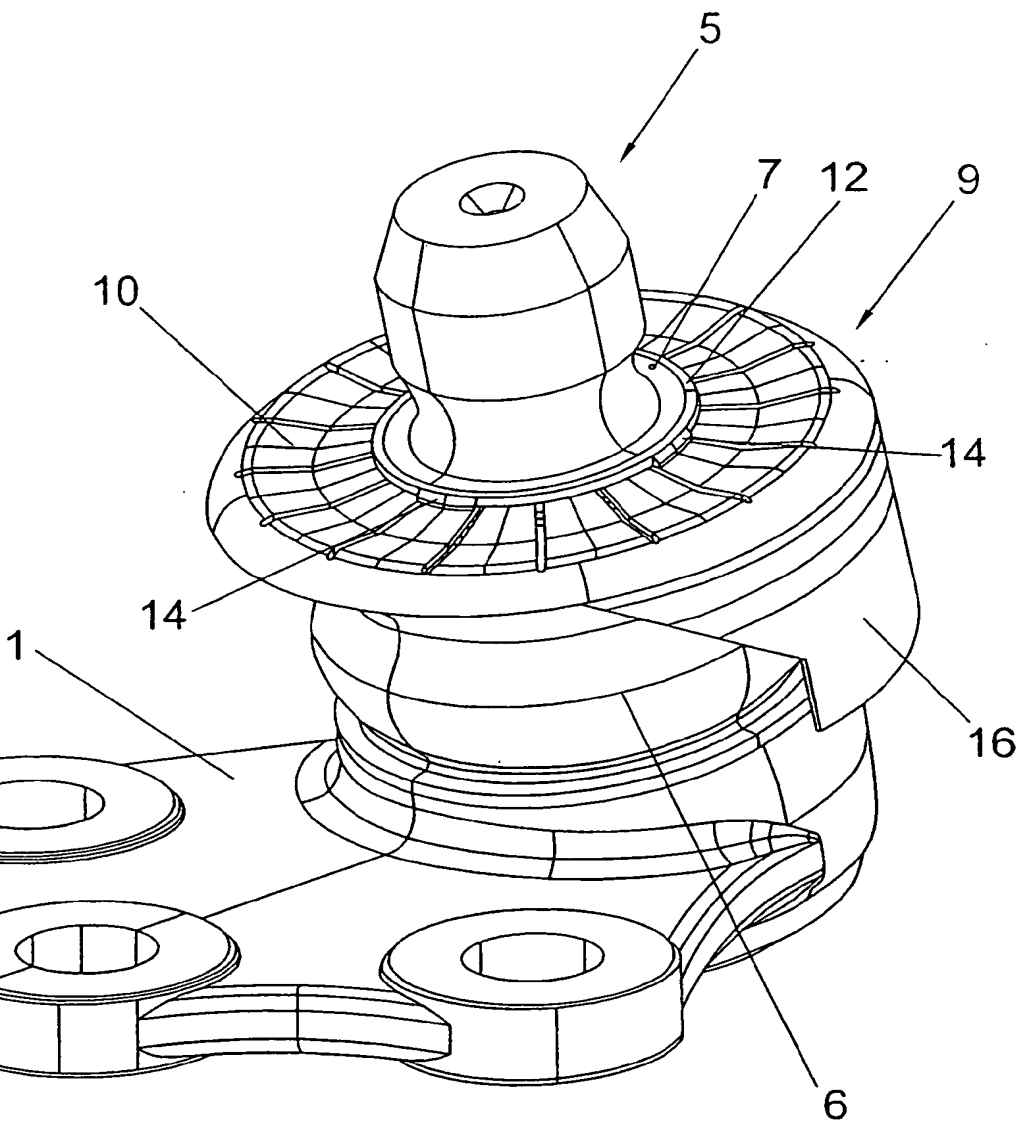
C L A I M S

1.- Ball joint with thermal protection which is of application to suspension and steering systems or stabilizer bars which are located in the vicinity of an  
5 source of excessive heat generation such as a brake and which starts from the basic incorporation of a swivel housing (1) on which one of the suspension components or equivalent is attached and which presents in its interior  
10 a housing (2) accommodating a bush (3) which rests and turns in sliding contact on a ball head (4) of a knuckle stem (5), provided with a dust boot (6) linked by way of its base to the swivel housing (1) and by its neck (7) to an upper section (8) of the knuckle stem (5), and with a  
15 thermal protector (9) integrated in the ball joint protecting the dust boot (6) from high temperatures generated in the surrounding area, wherein the ball joint incorporates a connecting ring (12) which has been previously linked to the neck (7) of the dust boot (6) by  
20 ~~cover~~<sup>cover</sup> injection or pressure and/or gluing, and wherein the thermal protector (9) presents a horizontal upper face defining interiorly a circular opening (11) which is fixed to the connecting ring (12),  
characterised in that  
25 the connecting ring has a base (13) and a side face from which there project a series of tabs (14),  
in that  
the horizontal upper face of the thermal protector is provided with a series of flexible radial plates (10)  
30 that define interiorly said circular opening (11),  
and in that  
said horizontal upper face is fixed to the connecting ring by pressure of the plates (10) on the tabs (14)  
until they pass over them, with the result that said  
35 plates (10) are engaged between the tabs (14) and the

base (13) of the connecting ring (12).

2.- Ball joint with thermal protector (9) according to claim 1 characterised in that the thermal protector (9) takes the form of a hood which extends initially in the horizontal upper face and is prolonged inferiorly by way of sloping side edges which terminate in vertical walls (16) defining a spacious cutaway (15) which leaves the dust boot (6) partly exposed in the sector opposite the sector of the ball joint facing the heat source, said vertical walls (16) being separated from the dust boot (6) defining an air chamber between both which produces the thermal insulation of the dust boot (6).





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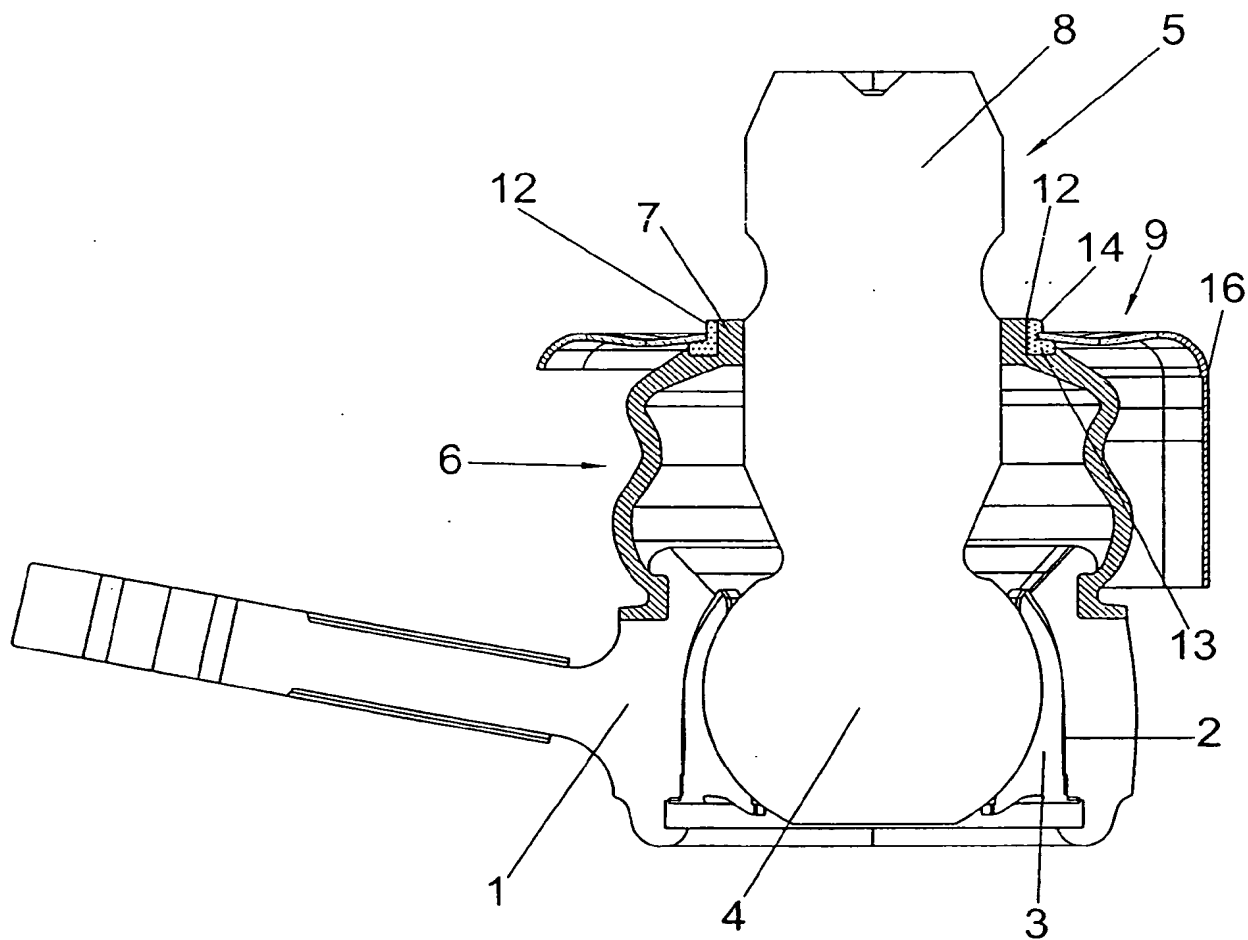


FIG. 2

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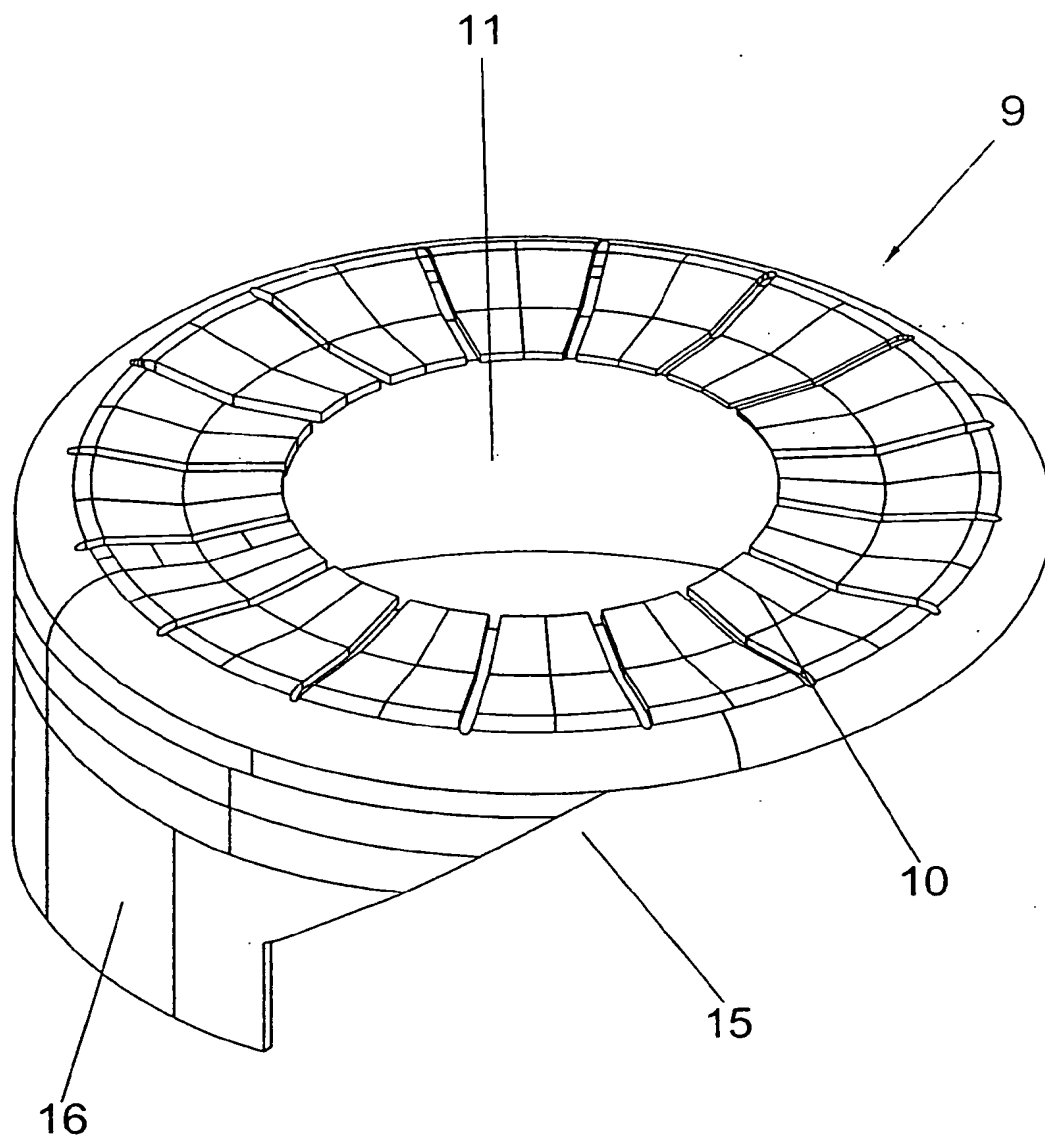


FIG. 3

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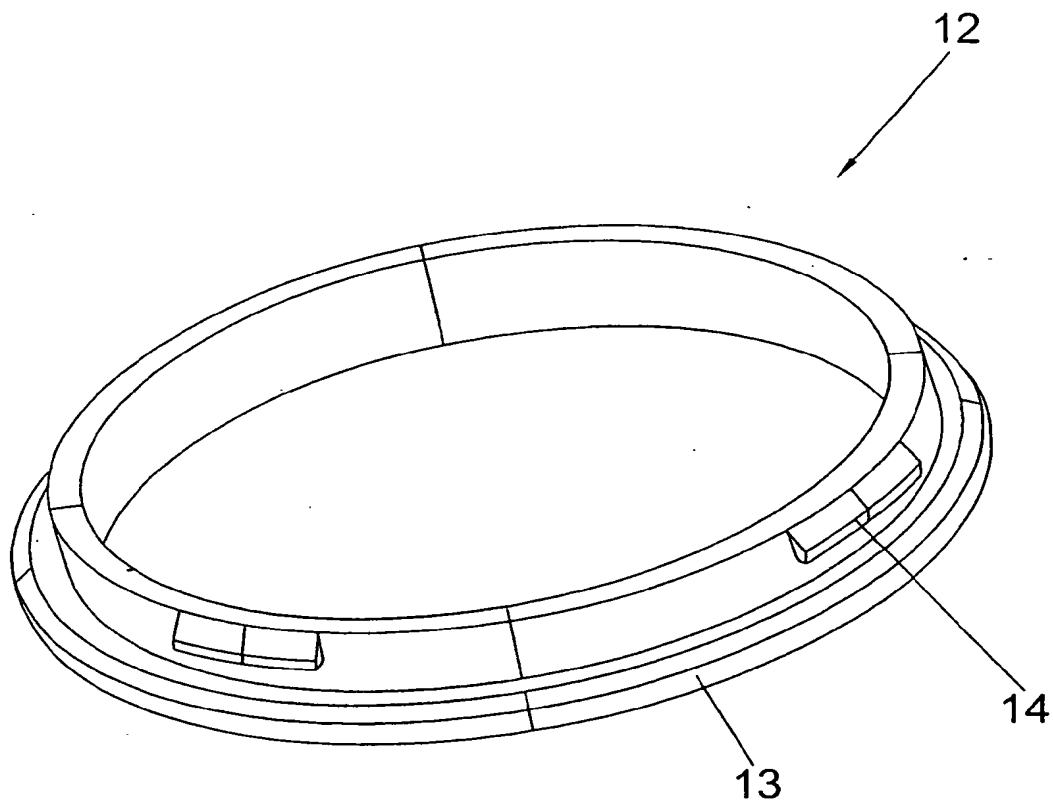


FIG. 4

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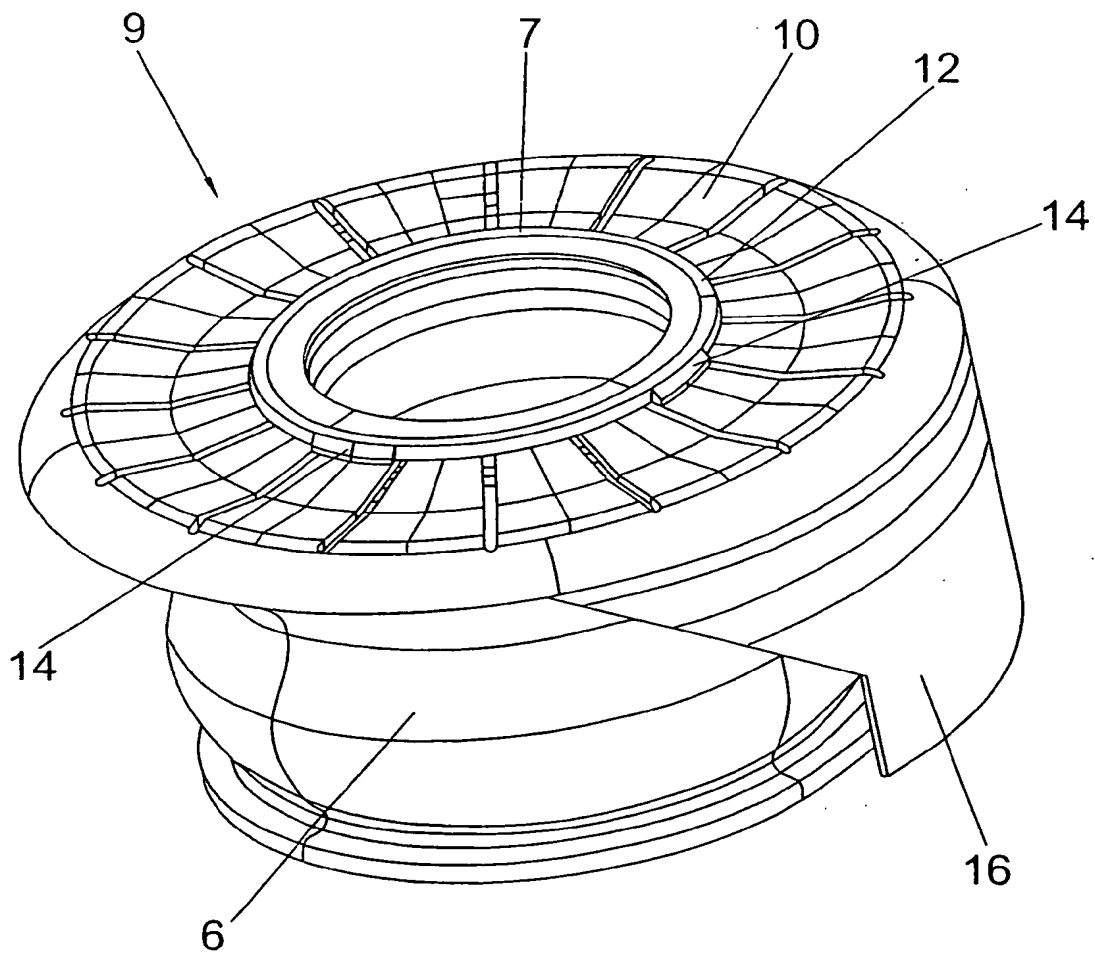


FIG. 5

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# HERRERO & ASOCIADOS

ASESORES EUROPEOS EN PATENTES Y MARCAS  
INTERNATIONAL PATENT AND  
TRADEMARK CONSULTANTS

ABOGADOS - LAWYERS

EPO - Munich  
80  
18. Mai 2007

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Your ref.

Our ref.  
20051119/MS-

Madrid,  
16 May 2007

European patent application no. 03740495.1-2424  
Applicant: ZF FRIEDRICHSHAFEN AG

Dear Sirs:

With reference to the Communication pursuant to Article 96(2) EPC, we herewith submit the following:

### (1) AMENDMENTS

First of all, we thank the Examiner for his/her detailed analysis of the application and of the cited prior art. We herewith amend the claims. We enclose:

- A. Claims amendment explanation sheets 7 and 8, comprising the text of the claims currently on file but with highlighted amendments: added text has been underlined and deleted text has been crossed through.
- B. Replacement sheets 7 and 8, comprising the amended claims (amended as specified in the claims amendment explanation sheets).
- C. Replacement sheet 3, comprising a copy of page 3 as currently on file, but with hand-written amendments.

We have amended the claims following the Examiner's suggestions.

On page 3, we have acknowledged D1 (=WO-A-02/101250).

No further amendments appear to be necessary; there appears to be no contradiction between the description on file and the amended claims filed herewith.

### (2) NOVELTY (ART. 52&54 EPC) AND INVENTIVE STEP (ART. 52&56 EPC)

The Examiner has already acknowledged that the subject-matter of claim 1 filed herewith appears to be novel and to involve an inventive step.

**(3) FINAL REMARKS**

Finally, please, consider the following:

(3.1) It is respectfully submitted that the applicant(s) may wish to obtain protection for the entire subject-matter of the application as originally filed. Thus, it is pointed out that any subject-matter that has been withdrawn (or that may be considered to have been withdrawn) from the application or otherwise abandoned, either implicitly or explicitly, by way of amendment or in any other way, can be reinstated to the application by way of corresponding amendments and/or clarifications, or can be made the subject of one or more divisional applications at any moment during pendency of the present application.

(3.2) We expect that the application is now in condition for acceptance.

Now, should the Examiner not consider all the objections raised in the Communication under Art. 96(2) EPC to have been overcome, or should the Examiner consider that new objections may arise (due to the amendments or for other reasons), it is requested that the Examiner issue a further Communication under Art. 96(2) EPC.

Of course, should the Examiner consider that a telephone interview could help to expedite the prosecution of the application, we would be pleased to discuss any outstanding matter with the Examiner over the telephone (our telephone number is +34 91 522 74 20).

In any case, it is requested that prior to any refusal of the application, oral proceedings be granted.

Respectfully submitted,  
**HERRERO & ASOCIADOS**

  
Carpintero López, Francisco

Enc.: as specified above

C L A I M S

1.- Ball joint with thermal protection which is of application to suspension and steering systems or stabilizer bars which are located in the vicinity of an source of excessive heat generation such as a brake and which starts from the basic incorporation of a swivel housing (1) on which one of the suspension components or equivalent is attached and which presents in its interior a housing (2) accommodating a bush (3) which rests and turns in sliding contact on a ball head (4) of a knuckle stem (5), provided with a dust boot (6) linked by way of its base to the swivel housing (1) and by its neck (7) to an upper section (8) of the knuckle stem (5), and with a thermal protector (9) integrated in the ball joint protecting the dust boot (6) from high temperatures generated in the surrounding area, ~~characterised in that it wherein the ball joint incorporates a connecting ring (12) which has a base (13) and a side face from which there project a series of tabs (14), which is~~ has been previously linked to the neck (7) of the dust boot (6) by superinjection or pressure and/or gluing, and ~~in that wherein the thermal protector (9) presents a horizontal upper face with a series of flexible radial plates (10) that definedefining~~ interiorly a circular opening (11) which is fixed to the connecting ring (12), characterised in that the connecting ring has a base (13) and a side face from which there project a series of tabs (14), in that the horizontal upper face of the thermal protector is provided with a series of flexible radial plates (10) that define interiorly said circular opening (11), and in that said horizontal upper face is fixed to the connecting



| ring by pressure of the plates (10) on the tabs (14) until they pass over them, with the result that said plates (10) are engaged between the tabs (14) and the base (13) of the connecting ring (12).

5

2.- Ball joint with thermal protector (9) according to claim 1 characterised in that the thermal protector (9) takes the form of a hood which extends initially in the horizontal upper face and is prolonged inferiorly by way of sloping side edges which terminate in vertical walls (16) defining a spacious cutaway (15) which leaves the dust boot (6) partly exposed in the sector opposite the sector of the ball joint facing the heat source, said vertical walls (16) being separated from the dust boot (6) defining an air chamber between both which produces the thermal insulation of the dust boot (6).

10

15

C L A I M S

1.- Ball joint with thermal protection which is of application to suspension and steering systems or stabilizer bars which are located in the vicinity of an source of excessive heat generation such as a brake and which starts from the basic incorporation of a swivel housing (1) on which one of the suspension components or equivalent is attached and which presents in its interior a housing (2) accommodating a bush (3) which rests and turns in sliding contact on a ball head (4) of a knuckle stem (5), provided with a dust boot (6) linked by way of its base to the swivel housing (1) and by its neck (7) to an upper section (8) of the knuckle stem (5), and with a thermal protector (9) integrated in the ball joint protecting the dust boot (6) from high temperatures generated in the surrounding area, wherein the ball joint incorporates a connecting ring (12) which has been previously linked to the neck (7) of the dust boot (6) by superinjection or pressure and/or gluing, and wherein the thermal protector (9) presents a horizontal upper face defining interiorly a circular opening (11) which is fixed to the connecting ring (12), characterised in that

the connecting ring has a base (13) and a side face from which there project a series of tabs (14), in that

the horizontal upper face of the thermal protector is provided with a series of flexible radial plates (10) that define interiorly said circular opening (11), and in that

said horizontal upper face is fixed to the connecting ring by pressure of the plates (10) on the tabs (14) until they pass over them, with the result that said plates (10) are engaged between the tabs (14) and the

base (13) of the connecting ring (12).

2.- Ball joint with thermal protector (9) according to claim 1 characterised in that the thermal protector (9) takes the form of a hood which extends initially in the horizontal upper face and is prolonged inferiorly by way of sloping side edges which terminate in vertical walls (16) defining a spacious cutaway (15) which leaves the dust boot (6) partly exposed in the sector opposite the sector of the ball joint facing the heat source, said vertical walls (16) being separated from the dust boot (6) defining an air chamber between both which produces the thermal insulation of the dust boot (6).

<->

The optimization of the means used for the protection of the ball joint from heat make the invention described below feasible.

5       **DESCRIPTION OF THE INVENTION**

10       The ball joint with integrated thermal protector proposes a clearly satisfactory solution in comparison with other solutions adopted previously in terms of functional efficacy, installation and reduction of costs.

15       The use of this ball joint with thermal protector reduces costs considerably in relation to the use of shields on the disc brakes, not only because it is the case of a protection element of smaller size and weight, but also due to the reduction in installation operations and in the number of components.

20       Furthermore, the thermal protector has an added feature in that it acts as a means of protection against the damage that the ball joint might suffer during handling, as it replaces the plastic cap normally used for this purpose.

25       Integration of the thermal protector in the ball joint is therefore the basic object of this invention, since it is designed to cover the dust boot normally fitted to the ball joint, which is provided with a connecting ring that is fixed to the dust boot beforehand and on which the thermal protector is attached.

30

35       For its part the dust boot consists of a rubber cover which is normally fitted on an upper shoulder of the ball joint swivel housing and is extended upwards with sinuous forms as far as an upper neck which closes

<WO-A-02/101250 discloses an arrangement substantially according to the preamble of claim 1.>



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Application No. 03 740 495.1 - 2424	Ref. 20051119	Date 19.02.2007
Applicant ZF FRIEDRICHSHAFEN AG		

**Communication pursuant to Article 96(2) EPC**

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

**of 4 months**

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 83(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

**Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).**



Durand-Smet, Jérôme  
Primary Examiner  
for the Examining Division

Enclosure(s): 2 page/s reasons (Form 2906)

**Bescheid/Protokoll (Anlage)**

Datum  
Date  
Date 19.02.2007

**Communication/Minutes (Annex)**

Blatt  
Sheet  
Feuille 1

**Notification/Procès-verbal (Annexe)**

Anmelde-Nr.:  
Application No.: 03 740 495.1  
Demande n°:

The examination is being carried out on the **following application documents**:

**Description, Pages**

1-6 filed with entry into the regional phase before the EPO

**Claims, Numbers**

1, 2 filed with entry into the regional phase before the EPO

**Drawings, Sheets**

1/5-5/5 filed with entry into the regional phase before the EPO

1. The following observations are made to claim 1:
  - 1.1. It is already known from **WO-A-02/101250** to provide a ball joint with thermal protection which is of application to suspension and steering systems or stabilizer bars which are located in the vicinity of a source of excessive heat generation such as a brake and which starts from the basic incorporation of a swivel housing on which one of the suspension components or equivalent is attached and which presents in its interior a housing (2) accommodating a bush (3) which rests and turns in sliding contact on a ball head (4) of a knuckle stem (5), provided with a dust boot (6) linked by way of its base to the swivel housing and by its neck to an upper section of the knuckle stem (5), and with a thermal protector (7) integrated in the ball joint protecting the dust boot (6) from high temperatures generated in the surrounding area.  
Furthermore, this prior art ball joint incorporates a connecting ring (8) which has been previously linked to the neck of the dust boot (6) by superinjection or pressure and/or gluing, and the thermal protector (7) presents a horizontal



upper face defining interiorly a circular opening which is fixed to the connection ring (8).

- 1.2. Vis-à-vis this prior art ball joint, the subject-matter of claim 1 differs in that the connecting ring has a base and a side face from which there project a series of tabs, the horizontal upper face of the thermal protector is provided with a series of flexible radial plates that define interiorly said circular opening, said horizontal upper face being fixed to the connecting ring by pressure of the plates on the tabs until they pass over them with the result that said plates are engaged between the tabs and the base of the connection ring.
- 1.3. As there is no suggestion to a skilled person among the other cited prior art documents to provide these features in combination with those noted in paragraph 1.1. above, the subject-matter of claim 1 seems to meet the requirements of articles 52 (1), 54 and 56 EPC. However, claim 1 should be properly presented in the two-part form prescribed by rule 29 (1) a, b EPC such that those features which, in combination, are common to the invention and the nearest prior art disclosed in **WO-A-02/101250** are referred to in the precharacterising portion of claim 1, see paragraph 1.1. above while those features which differentiate the invention from this prior art are defined in the characterising portion, see paragraph 1.2. above.
2. Claim 2 would then be allowable as a dependent claim.
3. The applicant is therefore invited:
- a) to file a new set of claims, as suggested above; and
- b) to revise the description to ensure consistency with the new set of claims. Furthermore, as explained in the Guidelines, C-II, 4.3 in conjunction with C-III, 2.2, the description should include an acknowledgement of **WO-A-02/101250** for compliance with rule 27 (1) b, c EPC.

Jérôme DURAND-SMET